1C: Puget Sound Seafood-The Human Health Link

Questions & Answers

Q: Regarding the survey. Do you know the nationality of the respondents?

A: Yes we do, and we had a very wide range of nationalities reported. About 40 percent of the individuals were Caucasian, followed by African American at probably 15 percent, and then a whole range of different nationalities after that at 10 percent or less.

Q: What nationalities ate the fish daily?

A: That was, again, very similar to the range that we saw. There were a few Caucasian, a few African American, a few Asians, different Asian ethnicities as well.

Q: Given the nationalities represented in respondents, I'm concerned about the language skills of the surveyors. Also, I'd like to know whether you took into consideration that some people might have been afraid to give accurate answers about how often they were eating fish. How did you deal with some of those cultural differences.

A: Our surveyors, in general, spoke English. We had our survey forms translated into foreign languages as well. Vietnamese, Laotian, and others (I don't remember, I'd have to look it up.) But we did have quite a few of those (non-English) forms filled out. We had a mark on the survey where the surveyor would indicate whether or not they perceived a language barrier (e.g., the person that they were interviewing might have been uncomfortable with English). That got filled out on 99 of about 1900 survey forms, so in approximately 5 percent of the surveys, the surveyor perceived a language barrier. As far as the reluctance to give an accurate answer, we didn't have a question where the surveyor could mark down whether or not they thought they were getting an accurate answer. There's really no way to account for that. We tried to make it sound like we were doing a research project. We tried not to come across as government officials. We did not wear badges or caps or anything that would indicate that we were officials, so that we would not put someone off and make them reluctant to give us a truthful answer. We tried to basically go out there and become their friends, in essence, so they would give us the best answers they could.

Q: I'm surprised with your ethnic representation because at Carkeek Park, we observe that people harvesting shellfish are probably about 80 percent Asian. Are you planning to measure fecal coliform levels in shellfish?

A: As far as the survey goes, I would suspect that the ethnicities of the folks collecting seafood would vary from locality to locality, so seeing different ethnicities in a different location is to be expected. I can't comment on the fecal coliform levels in shellfish. Can you comment on that?

A: Yes. We will continue to measure fecal contamination in both intertidal waters and shellfish at Carkeek.

Q: Did your survey ask about food preparation or the amount of the organism consumed or did you just assume a 100 percent consumption rate? If 50 percent of people say they don't eat the organisms, I would kind of wonder why they were investing the energy to fish. Maybe were they selling their catch and were afraid to tell you they were selling it?

A: Yes, we asked both those questions, I didn't present the results here because I was trying to keep the talk short – because I had only 13 minutes. Regarding food preparation, we had one individual who said that they intended to eat some of their seafood raw. The rest of the individuals indicated a preferred cooking method. For fish, it was generally broiled or grilled, or maybe it was baked or grilled. We have the data about what percentage said they were going to do what for fish and shellfish. Regarding the amount eaten, we asked, "What portion of the collected seafood would you eat?" The vast majority of the folks that we interviewed said just the fillets for the fish, although we did have some folks who said

fillets and skin. We also had folks that said they were going to eat the entire organism. As far as what amount was collected, that's a good question. It really seemed, as far as I can tell, that there were a lot of folks that just enjoyed fishing. It is possible that some were selling their catch, but no one ever mentioned it.

Q: Are there King County CSO's at other freshwater sites or are they non-King County CSO's?

A: There are still some freshwater CSO's in the Ship Canal and in Lake Union. Those sites are going to be controlled sooner rather than later, meaning that there are plans already in the works to control those CSO's. The CSO's in Lake Washington, with the exception of one for which controls are being designed right now, have already been controlled. It is our expectation that we will be doing some extensive analysis in the freshwater CSO's. There is a plan that you will be hearing more about in the future.

Q: This discussion of freshwater CSO's raises an interesting question about species that you would use for monitoring. Certainly mussels aren't going to do well in freshwater.

A: There are other bivalves that are found in freshwater that, I think, could be used like we used mussels in marine waters to study bioaccumulation.

Q: The survey is interesting. How do you extrapolate from the data you've collected to an appropriate consumption range within your study area? For instance, you acknowledge that you'd get different species mixes at other times of the year. Also, you didn't survey at night during your ten week survey. I was under the impression that between 8:00pm and 5:00am there were no people surveying. Is that correct?

A: No one was surveying after 10:00pm.

Q: So most of the night period was not covered. So how do you extrapolate if you want to use an appropriate consumption rate within your study area. Are you going to be using other studies? How are going to use the information you've collected?

A: You hit the nail on the head there, Glen, with that question. The question is how to extrapolate from results to determine an appropriate consumption rate for our study. Essentially what we intend to do is to look at our results and come up with a range of consumption rates in combination with results from other studies. There have been studies conducted in Elliott Bay and other parts of Puget Sound dating back to the early 1980's and including a recent study that was conducted for two local tribes. That was conducted back in 1996, I believe. As far as extrapolating our results, there are ways to statistically extrapolate results, assuming we got a representative sample on some days, "how many people did we miss," and all that kind of stuff. At this point, we expect that consideration of these other factors would result in a lower consumption rate than the consumption rate we already have. One of the questions we're asking, or that we're considering, is whether or not it is worth extrapolating beyond what we have already done. For example, fewer people would go out less frequently in the nighttime hours than went out in the daytime hours. We are still looking into it.

Q: Were there any fish consumption advisories during the survey? Will they continue?

A: There is an ongoing advisory against harvesting of shellfish in Elliott Bay. That advisory was present last summer during our survey. I'm not sure, personally, whether or not there are other advisories in the bay. We did not make an attempt to notify people or to check whether or not people were doing anything illicit or illegal. We just wanted to go out there and see what was actually happening,.

Q: To follow up on the not needing to monitor the use of source control, or what ever, in freshwater CSO's, there is a comparable example in the marine environment. A year or so ago Alan Mearns made an interesting calculation with regards to the decreasing output of zinc from Los Angeles county. At the same time the bioavailability of zinc went up in organisms in the area. So I think that monitoring, just to make sure that your source control has really done what you expect, may be a reasonable thing to consider.

A: That's a very good comment.

Q: When you do the risk assessment, where are you getting the data for the concentrations of fish?

A: The water quality assessment had a very comprehensive sampling program associated with it where we sampled a wide range of fish and shellfish species in Elliott Bay and Duwamish River. A portion of that program was represented by John's talk here on the mussels, but we also sampled a wide range of other species, partly in conjunction with the Department of Fish and Wildlife.

A: Some of the data from that aspect of the work are presented in the poster session. At least for tributyl tin, in a number of fin fish and shellfish species including crabs, prawns and intertidal invertebrates.

Q: I'm interested in the Mason County sanitary survey that Will presented. My impression was that there was voluntary participation in the survey and mandatory repairs to sanitary systems at the owner's expense. How did the politics of that work?

A: It really varied from watershed to watershed. From my observation, it relates to what the project's momentum and, somewhat, on the history of the area. Totten-Skookum was formed as a voluntary shellfish protection district. The shellfish growers chipped in with $36,000 (I think) to help defray the cost. It was a different political climate in lower Hood Canal with some very vocal and active opposition. In lower Hood Canal it spun into a political realm where you got neighbors saying, "Well, if my neighbor is not going to voluntarily do this program, I'll be damned if I will." There was really some divisive stuff and threatened lawsuits. I think Will was quite politic in explaining how it really is important that the front line people are good readers of people's reactions, and that they try to listen. A positive, cooperative spirit as opposed to getting in an argument with somebody, which unfortunately did happen in some of those cases. Those negative words spread real quickly, and pretty soon you get a whole section of a neighborhood up in arms and saying, "Over my dead body will you come onto my land and check my on site system."

Q: Tim, since you found disappointing results, that the water quality seems to be declining in most of those areas, have you gone back to the shellfish protection districts or the watershed planning groups to look at what they are already trying to accomplish, and what else might be on their list that they haven't got around to yet?

A: After I presented these results to managers at Department of Health, I was told to take the results out to show to the local county health people. I have done this in the case of Henderson Inlet; we had a short meeting to discuss my findings. I think that people in the watershed management, or the implementation groups that have been set up, particularly in Henderson, are aware. I don't know whether they have taken it upon themselves to follow through. They haven't asked me to come back to talk to them specifically about it.

Comment: I think some of the work that Tim and others at the Department of Health's shellfish program have done in developing the "early warning system" is really good. They can go and talk to shellfish growers and also to local elected officials and say, "This is what the trends are looking like, and we've got real concerns in this area" before it gets to a downgraded condition. I'm hopeful that this will help us a little to encourage a spirit of cooperation. Ideally, this will allow us find out what the problems are and address them without a downgrade. Early response will be preferable to having a downgrade.

Q: John, you didn't present any time-zero data for wild or transplanted mussels and I'm wondering about that. And I'm curious if there was any CSO discharges during the transplants.

Strand: Regarding the time-zero analyses of the mussels to be transplanted – I do have that data. There wasn't a whole lot of difference between the time-zero and the time-one-month for the transplants that were maintained at the mussel farm where they came form. I just simply collected the wild mussels coincident with retrieval of the transplanted mussels. I didn't have a time-zero for them and a time-one-month. I just collected essentially once during the dry season, once during the wet season. And again, it was coincident with retrieval of the transplanted mussels. Yes, there were discharge events during the wet season; a series of them. That was very wet year; the hydrograph for the river over that one-month period

in which the transplants were deployed went from about 2,000 CFS to nearly 10,000 CFS and dropped back down. There were a number of discharges over that period. At the Brandon Street CSO, at the Duwamish Diagonal Way CSO, and the Hanford CSO. We have the actual number tallied, but I can't recall them off the top of my head. But, yes, multiple discharges over that one-month period. There were no discharges over the dry season. The first discharges came late in October after the transplanted mussels were removed from that dry season exposure.

Q: The Mason County survey found maybe 10 percent of the systems were failures, and they found out that 90 percent were OK. Did they make any kind of assessment how that 90 percent tested and how many they missed. Were all the systems really good?

A: I'm not clear from the data that Will presented today. There's a more clear report that the county has done in the past that shows where they've used dye testing at waterfront homes.

Q: In the survey, how did you ask the question about whether or not they were eating the seafood?

A: I'd have to go back and read the survey form again, but I believe that it asked if you would eat what you had actually caught, not just what you were targeting.

Q: Is the survey information broken down by age?

A: We broke it into four categories: "less than 15," "15 to 30," etc. Most of the folks were in the "15-45" age. So there were a few folks under 15 there, but it was a very small percentage. We also asked whether or not they would share the seafood with anyone under 10. We had 27 people total who said that they were going to share their catch with people under 10. So, there are children eating this seafood as well.

Q: Kim, in your compositing of, for instance, native littlenecks clams that you were sampling, did you try and select a certain size clam as a typical size so you'd get uniform samples from one place to another (to account for age effect on concentration)?

A: Samples were not necessarily selected to be the same size, but they had to be of marketable size. The ranges of sizes could have varied, but they tried to minimize the age variation.

Q: John, in the time period that you were looking, did you see a change in growth rate of the transplanted mussels that you got from the farm?

A: With very accurate weighing and sizing we did follow growth both in the dry season and in the wet season as it might related to effects. Clearly the mussels in the dry season grew much more than in the wet season, and the mussels left at the farm grew 65 percent. That's the percent increase in weight from the time that they were transplanted. The mussels in the river grew an average of 20 to 25 percent. There were some differences with location, but they did grow, not nearly as efficiently as the mussels that were kept on the farm. Growth in the wet season decreased significantly from that, but the mussels in the river did grow about 5 percent. The mussels that were kept at the mussel farm at Totten Inlet grew a bit more. There was growth, even in the wintertime.